

WE CLAIM:

1. A composition comprising:  
a buffer effective for maintaining pH of aqueous composition at greater than or equal  
5 to about 6; and

an organic anion of formula I:  $R(X)_m(Y)_n$ ; in which:

R is alkyl, alkenyl, or alkynyl;

each X is independently carboxylate, phenol substituted with strongly electron  
withdrawing groups, phosphate, phosphonate, phosphinate, sulphate, sulphonate,  
10 thiocarboxylate, hydroxamate, or combination thereof;

each Y is independently amide, alcohol, ether, thiol, thioether, ester, thioester,  
borane, boric acid, or metal complex;

m is 1-7; and

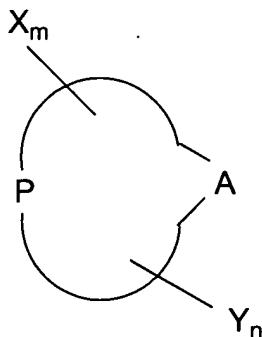
n is greater than 1;

15 the organic anion being effective to substantially decrease ring formation upon drying  
of a spot less than or equal to about 300  $\mu\text{m}$  diameter on a support.

2. The composition of claim 1, wherein each X is independently phosphate or  
sulfate.

3. The composition of claim 1, wherein each Y is hydroxyl.

4. The composition of claim 1, wherein the organic anion of formula I has the  
structure of represented by formula II:

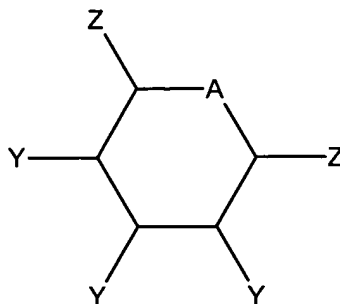


in which P represents an additional 4-7 members of cyclic backbone comprising carbon with up to one heteroatom.

5. The composition of claim 4, wherein each X is independently phosphate or sulfate.

6. The composition of claim 4, wherein each Y is hydroxyl.

7. The composition of claim 1, wherein the organic anion of formula I has the structure of represented by formula III:



in which:

Z is -OH, -OPO<sub>3</sub><sup>-</sup> or -CH<sub>2</sub>-OPO<sub>3</sub><sup>-</sup>; and

at least one Z is -OPO<sub>3</sub><sup>-</sup> or -CH<sub>2</sub>-OPO<sub>3</sub><sup>-</sup>;

Y is -OH; and

A is -CH-OPO<sub>3</sub><sup>-</sup> or O.

8. The composition of claim 7, wherein the organic anion is glucose-1-phosphate, glucose-6-phosphate, phytate, or mixture thereof.

9. The composition of claim 1, further comprising compound suitable for being immobilized on the support.

10. The composition of claim 9, wherein the compound comprises nucleic acid.

11. The composition of claim 10, wherein the nucleic acid comprises DNA, RNA, or mixture thereof.

12. The composition of claim 1, further comprising anionic or nonionic surfactant.

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13. The composition of claim 12, wherein the anionic surfactant comprises sodium dodecyl sulfate.

14. The composition of claim 1, wherein the buffer comprises inorganic phosphate.

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15. The composition of claim 14, wherein the inorganic phosphate comprises about 10 to about 200 mM sodium or potassium phosphate at pH of about 7 to about 10.

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16. A composition comprising:  
compound suitable for being immobilized on support; and  
organic anion of formula:  $R(X)_m(Y)_n$ ; in which:

R is alkyl, alkenyl, or alkynyl;

20

each X is independently carboxylate, phenol substituted with strongly electron withdrawing groups, phosphate, phosphonate, phosphinate, sulphate, sulphonate, thiocarboxylate, hydroxamate, or combination thereof;

each Y is independently amide, alcohol, ether, thiol, thioether, ester, thioester, borane, boric acid, or metal complex;

m is 1-7; and

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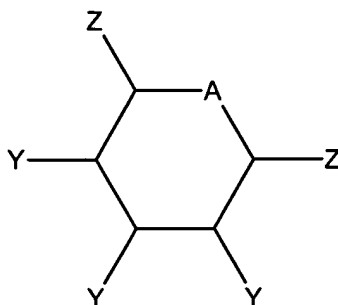
n is greater than 1.

17. The composition of claim 16, wherein the compound comprises nucleic acid.

18. The composition of claim 17, wherein the nucleic acid comprises DNA, RNA, or mixture thereof.

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19. The composition of claim 16, wherein the organic anion of formula I has the structure of represented by Formula III:



in which:

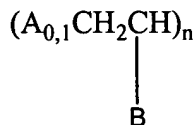
- 5           Z is -OH, -OPO<sub>3</sub><sup>-</sup> or -CH<sub>2</sub>-OPO<sub>3</sub><sup>-</sup>; and  
               at least one Z is -OPO<sub>3</sub><sup>-</sup> or -CH<sub>2</sub>-OPO<sub>3</sub><sup>-</sup>;  
               Y is -OH; and  
               A is -CH-OPO<sub>3</sub><sup>-</sup> or O.

10           20. The composition of claim 19, wherein the organic anion is glucose-1-phosphate, glucose-6-phosphate, phytate, or mixture thereof.

21. The composition of claim 16, further comprising anionic surfactant.

15           22. A composition comprising:  
               a buffer effective for maintaining pH of aqueous composition at greater than or equal to about 6; and

              neutral hydrophilic polymer of Formula V:



20           in which, A is absent, CH<sub>2</sub> or O;  
               n is about 100 to about 5000; and  
               B is -OH, -OC(O)CH<sub>3</sub>, -CONH<sub>2</sub>, -CONHR, -CONR<sub>2</sub>, -OCH<sub>3</sub>, -SH, -SCH<sub>3</sub>, -COOR, -COSR, borane, boric acid, sulfone, amine oxide, or mixtures thereof;  
               the neutral hydrophilic polymer being effective to substantially decrease ring  
 25           formation upon drying of a spot less than or equal to about 300 μm diameter on a support.

23. The composition of claim 22, wherein A is absent, n is about 600 to about 1300, and B is -OH.

5           24. The composition of claim 22, wherein the neutral hydrophilic polymer comprises polyvinyl alcohol.

25. The composition of claim 24, wherein the neutral hydrophilic polymer comprises and the polyvinyl alcohol comprises 88% hydrolyzed polyvinyl alcohol.

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26. The composition of claim 24, wherein the neutral hydrophilic polymer comprises polyvinyl alcohol and the polyvinyl alcohol has a molecular weight of 31-51 kD.

27. The composition of claim 22, further comprising compound suitable for being  
15 immobilized on the support.

28. The composition of claim 27, wherein the compound comprises nucleic acid.

29. The composition of claim 28, wherein the nucleic acid comprises DNA, RNA,  
20 or mixture thereof.

30. The composition of claim 22, further comprising anionic or nonionic surfactant.

25           31. The composition of claim 30, wherein the anionic surfactant comprises sodium dodecyl sulfate.

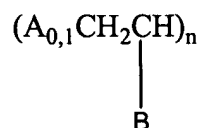
32. The composition of claim 22, wherein the buffer comprises inorganic phosphate.

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33. The composition of claim 32, wherein the inorganic phosphate comprises about 10 to about 200 mM sodium or potassium phosphate at pH of about 7 to about 10.

34. A composition comprising:

5 compound suitable for being immobilized on support; and  
neutral hydrophilic polymer of Formula V:



in which, A is absent, CH<sub>2</sub> or O;

n is about 100 to about 5000; and

10 B is -OH, -OC(O)CH<sub>3</sub>, -CONH<sub>2</sub>, -CONHR, -CONR<sub>2</sub>, -OCH<sub>3</sub>, -SH, -SCH<sub>3</sub>, -  
COOR, -COSR, borane, boric acid, sulfone, amine oxide, or mixtures thereof;  
the neutral hydrophilic polymer being effective to substantially decrease ring  
formation upon drying of a spot less than or equal to about 300 μm diameter on a support.

15 35. The composition of claim 34, wherein A is absent, n is about 600 to about  
1300, and B is -OH.

36. The composition of claim 34, wherein the neutral hydrophilic polymer  
comprises polyvinyl alcohol.

20 37. The composition of claim 36, wherein the polyvinyl alcohol comprises 88%  
hydrolyzed polyvinyl alcohol.

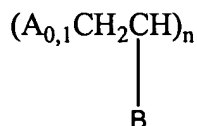
38. The composition of claim 36, wherein the polyvinyl alcohol comprises  
25 polyvinyl alcohol with a molecular weight of 31-51 kD.

39. The composition of claim 34, wherein the compound comprises nucleic acid.

40. The composition of claim 39, wherein the nucleic acid comprises DNA, RNA,  
30 or mixture thereof.

41. The composition of claim 34, further comprising anionic surfactant.
42. A method of forming spots of a compound on a surface, the method  
5 comprising:  
applying to the surface a composition comprising:  
compound suitable for being immobilized on the surface; and  
an organic anion of formula I:  $R(X)_m(Y)_n$ ; in which:  
R is alkyl, alkenyl, or alkynyl;  
10 each X is independently carboxylate, phenol substituted with strongly  
electron withdrawing groups, phosphate, phosphonate, phosphinate, sulphate,  
sulphonate, thiocarboxylate, hydroxamate, or combination thereof;  
each Y is independently amide, alcohol, ether, thiol, thioether, ester,  
thioester, borane, boric acid, metal complex;  
15 m is 1-7; and  
n is greater than 1; and  
forming a spot on the surface.
43. The method of claim 42, wherein the organic anion is effective to  
20 substantially decrease ring formation upon drying of a spot less than or equal to about 300  
 $\mu\text{m}$  diameter on a support.
44. The method of claim 42, wherein the composition further comprises a buffer  
effective for maintaining pH of aqueous composition at greater than or equal to about 7.5.  
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45. The method of claim 42, wherein applying comprises pin spotting or  
piezoelectric spotting.
46. A method of forming spots of a compound on a surface, the method  
30 comprising:  
applying to the surface a composition comprising:

compound suitable for being immobilized on the surface; and  
neutral hydrophilic polymer of Formula V:



in which, A is absent, CH<sub>2</sub> or O;

5 n is about 100 to about 5000; and

B is -OH, -OC(O)CH<sub>3</sub>, -CONH<sub>2</sub>, -CONHR, -CONR<sub>2</sub>, -OCH<sub>3</sub>, -SH, -SCH<sub>3</sub>, -COOR, -COSR, borane, boric acid, sulfone, amine oxide, or mixtures thereof; and forming a spot on the surface.

10 47. The method of claim 46, wherein the organic anion is effective to substantially decrease ring formation upon drying of a spot less than or equal to about 300 μm diameter on a support.

15 48. The method of claim 46, wherein the composition further comprises a buffer effective for maintaining pH of aqueous composition at greater than or equal to about 7.5.

49. The method of claim 46, wherein applying comprises pin spotting or piezoelectric spotting.

20 50. An array of spots formed by the method of claim 42.

51. An array of spots formed by the method of claim 56.

25 52. A plurality of spots on a solid support, one or more of the spots comprising: compound suitable for being immobilized on support; and organic anion of formula: R(X)<sub>m</sub>(Y)<sub>n</sub>; in which:

R is alkyl, alkenyl, or alkynyl;

30 each X is independently carboxylate, phenol substituted with strongly electron withdrawing groups, phosphate, phosphonate, phosphinate, sulphate, sulphonate, thiocarboxylate, hydroxamate, or combination thereof;



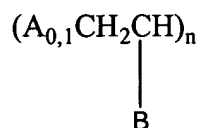
each Y is independently amide, alcohol, ether, thiol, thioether, ester, thioester, borane, boric acid, metal complex;

m is 1-7; and

n is greater than 1.

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53. A plurality of spots on a solid support, one or more of the spots comprising: compound suitable for being immobilized on support; and neutral hydrophilic polymer of Formula V:



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in which, A is absent, CH<sub>2</sub> or O;

n is about 100 to about 5000; and

B is -OH, -OC(O)CH<sub>3</sub>, -CONH<sub>2</sub>, -CONHR, -CONR<sub>2</sub>, -OCH<sub>3</sub>, -SH, -SCH<sub>3</sub>, -COOR, -COSR, borane, boric acid, sulfone, amine oxide, or mixtures thereof.